



**COLLEGE OF HEALTH AND MEDICAL SCIENCES**

**SCHOOL OF NURSING AND MIDWIFERY**

**SCHOOL OF GRADUATE STUDIES**

**Magnitude and factors associated with preeclampsia among pregnant  
women admitted in Hiwot Fana Comprehensive Specialized University  
Hospital, Eastern Ethiopia: A retrospective study**

**MSc Thesis**

**By: Asanti Jiregna (BSc)**

**July, 2023**

**HARAR, ETHIOPIA**

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**School: Nursing and Midwifery**

**Program: Maternity and Neonatal Nursing**

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**A Thesis Submitted to Schools of Nursing and Midwifery, Postgraduate Program Directorate, Haramaya University in Partial Fulfillment of the Requirements for the Degree of Master of Science in Maternity and Neonatal Nursing**

**July, 2023**

**Harar, Ethiopia**

**APPROVAL SHEET**  
**HARAMAYA UNIVERSITY**  
**POSTGRADUATE PROGRAM DIRECTORATE**

I hereby certify that I have read and evaluated this thesis entitled “Magnitude and factors associated with preeclampsia among pregnant women admitted in Hiwot Fana Comprehensive Specialized University Hospital, Eastern Ethiopia” prepared under my guidance by Asanti Jiregna. I recommend that it can be submitted as fulfilling the thesis requirement.

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## **BIOGRAPHICAL SKETCH**

I was born in 1993 in Nekemte, West Wollega, Oromia, Ethiopia. I completed my primary and secondary education in Nekemte Catholic Kidane Mihret School, and preparatory at Nekemte Preparatory and Comprehensive School. After, I graduating from Ambo University with a BSc in Midwifery in 2015, I joined Hiwot Fana Comprehensive Specialized University Hospital. After 5 years of work in the HFCSUH, I started my Master's study in Maternity and Neonatal Nursing at Haramaya University in 2021.

## **ACKNOWLEDGEMENTS**

First of all, I would like to express my gratitude to Haramaya University for funding this study. My deepest gratitude also goes to Haramaya University, College of Health and Medical Sciences, School of Nursing and Midwifery for allowing me to enroll in this postgraduate study program. Next, my deepest gratitude goes to my advisors, Prof Nega Assefa (PhD) and Dr. Abera Kenay (PhD) for their endless support and constructive comments throughout the research work. I would like to extend my appreciation to Haramaya University, College of Health and Medical Sciences librarian and internet center coordinators for their support and assistance in getting important materials to develop this thesis. Last but not least, my heartfelt thanks go to the data collectors, supervisors and my families and friends for their input and support throughout in my study.

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## **LIST OF ACRONYMS AND ABBREVIATIONS:**

ANC	Antenatal Care
AHR	Adjusted Hazard Ratio
AOR	Adjusted Odds Ratio
CHAMPS	Child Health And Mortality Prevention Surveillance
CHMS	College of Health and Medical Science
CI	Confidence Interval
COR	Crude Odd Ratio
DM	Diabetes Mellitus
HDP	Hypertensive Disorder in Pregnancy
HTN	Hypertension
HFCSUH	Hiwot Fana Comprehensive Specialized University Hospital
IHRERC	Institutional Health Research Ethics Review Committee
MRN	Medical Record Number
PE	Preeclampsia
SPSS	Statically Package for Social Science
WHO	World Health Organization

## ABSTRACT

**Background:** Preeclampsia, defined as a multisystem progressive disorder characterized by the new onset of hypertension and proteinuria, after 20 weeks of gestation or postpartum), it complicates 8% pregnancies globally. Moreover, preeclampsia increases the risk of adverse maternal, fetal and neonatal outcomes. Although pre-eclampsia is one of the leading causes of maternal deaths in Ethiopia, there is paucity of evidence on its magnitude and associated factors among the general obstetric population.

**Objective:** To assess the magnitude of and factors associated with preeclampsia among pregnant women admitted in Hiwot Fana Comprehensive Specialized Hospital, Eastern Ethiopia from June 15 to July 14, 2022.

**Methods:** An institution based cross sectional study was conducted. Eligible women admitted from January 1, 2019 to December 31, 2020 were selected using a simple random sampling technique. Data were extracted from maternal medical records using a structured and pretested abstraction checklist. Data were entered using Epi-Data 3.1 and analyzed using SPSS 26. Bivariable and multiple logistic regression analysis with 95% confidence interval (CI) was computed to identify factors associated with pre-eclampsia and described using adjusted odds ratio (AOR). All variables with  $p < 0.25$  in the binary logistic regression were entered into a multivariable analysis to identify the associated factor. Statistically significant association was declared at  $p < 0.05$ .

**Results:** A total 400 pregnant women with mean age of  $24.95 \pm 5.26$  years were included in the study. The magnitude of preeclampsia was 17.25% (95% CI: 13.85-21.28). Maternal age  $\geq 35$  ((AOR=4.50; 95% CI 1.89-10.76)), history of preeclampsia (AOR=2.42; 95% CI 1.16-5.04); family history of chronic hypertension (AOR=4.54; 95% CI 2.23- 9.23); Anemic (AOR=2.62; 95% CI 1.35-5.09); and chewing khat (AOR=2.98; 95% CI 1.50-5.91) were significantly associated with having preeclampsia.

**Conclusion:** Almost one in five pregnant women admitted included in the study developed preeclampsia. Maternal age  $\geq 35$  years, history of preeclampsia, family history of chronic hypertension, anemia and chewing khat were associated with pre-eclampsia. Strengthening early detection, including identifying history of pre-eclampsia and family history of hypertension are essential for preventing and/or early management of pre-eclampsia.

**Keywords:** pregnancy induced hypertension, preeclampsia, pregnant women, Ethiopia

# 1. INTRODUCTION

## 1.1 Background

Pregnancy induced hypertension is one of top five commonest causes of maternal death globally (Salam et al., 2015, United Nations Maternal Mortality Estimation Inter-agency, 2023) and marked by elevated blood pressure, which means diastolic blood pressure of 90 mmHg or higher or systolic blood pressure of 140 mmHg or higher after 20 weeks of gestation in a woman with previously normal blood (Brown et al., 2018b, ACOG, 2020). Pregnancy induced hypertension is classified into four subtypes: gestational hypertension, preeclampsia and eclampsia, chronic hypertension in pregnancy and preeclampsia superimposed on chronic hypertension (Ye et al., 2014).

Preeclampsia is a multisystem progressive disorder characterized by the new onset of hypertension and proteinuria or the new onset of hypertension and significant end-organ dysfunction with or without proteinuria in the last half of pregnancy or postpartum and frequently near term and can present as late as 4-6 weeks postpartum (ACOG, 2020, Magee et al., 2022).

According to ACOG 2020; Pre-eclampsia can seriously endanger both the woman and the fetus at any point/period, therefore labeling it as "mild" or "severe" might be inaccurate or deceptive to clinicians with less training. The diagnostic of "severe pre-eclampsia" has been replaced by "pre-eclampsia with or without severe characteristics," (American College of Obstetricians and Gynecologists (ACOG), 2020).

Clinically Preeclampsia defined as preeclampsia without severity feature in the absence any of the following features: cerebral symptoms (like visual disturbance, headache), right upper quadrant or epigastric pain, serum transaminase concentration  $\geq$  twice normal, systolic blood pressure  $\geq$  160 mm Hg, and or diastolic blood pressure  $\geq$  110 mm Hg on two occasions at least four hours apart, severe thrombocytopenia ( $<$ 100,000 platelets/micro), Oliguria  $<$ 500 mL in 24 hours and pulmonary edema (Brown et al., 2018a, Belay Tolu et al., 2020).

Although its incidence varies from country to country, pre-eclampsia is estimated to affect between 2% to 10% of pregnancies every year, being responsible for more than 500 000 fetal and neonatal deaths, and more than 70 000 maternal deaths worldwide (Brown et al.,

2018b, Meazaw et al., 2020). If undetected early and left untreated, preeclampsia may advance into severe life threatening condition, including eclampsia (characterized by convulsion) (Ayele and Tilahun, 2022) and superimposed/Hemolytic elevated liver low platelet count (HELLP) With significant adverse maternal and perinatal outcomes. While majority of deaths from preeclampsia are preventable through the provision of timely identification, detection, and effective treatment (Ayele and Tilahun, 2022), it continued to be responsible for mortality. Current strategies for prevention of preeclampsia include antenatal surveillance, modification of lifestyle, nutritional supplementation, and pharmacological therapy although termination of pregnancy is the only definitive treatment (Godana et al., 2021). Even though preeclampsia is a leading cause of maternal morbidity and mortality during pregnancy, labor and delivery little is known about the current prevalence of preeclampsia, its associated factors among women attending delivery services in Ethiopia in general and in the study area in particular.

## **1.2 Statements of the Problem**

According to World Health Organization (WHO) report in 2023, 287000 maternal deaths were recorded globally due to pregnancy and child birth related causes in 2020, Sub-Saharan Africa alone accounted for approximately 70% of global maternal deaths in 2020, followed by Central and Southern Asia, which accounted for almost 17% (United Nations Maternal Mortality Estimation Inter-agency, 2023).

In 2020, maternal mortality ratio for Ethiopia was 267 deaths per 100,000 live births. Maternal mortality ratio of Ethiopia fell gradually from 955 deaths per 100,000 live births in 2001 to 267 deaths per 100,000 live births in 2020. However there was significant reduction of Maternal mortality. still, it remains a major public health concern in the world including developing countries

Preeclampsia is remains significant public health problem in developing countries contributing to maternal, fetal morbidity and mortality. and it accounts 14.0% of direct maternal death worldwide (Say et al., 2014). Furthermore, preeclampsia is the second major contributor to maternal and perinatal morbidity and mortality, most of the times more common in low-resource settings than in well-resourced settings(Mol et al., 2016, Salam et al., 2015). It affects five to 10% of pregnant women worldwide and results poor maternal and prenatal outcome (Brown et al., 2018b, Hutcheon et al., 2011). It is

responsible for 76, 000 maternal deaths and 500,000 prenatal deaths globally per year (Salam et al., 2015).

In developing countries, the prevalence of preeclampsia is increasing over time with different factors and it is a manifestation of many causes (Gemechu et al., 2020). For instance the incidence of preeclampsia in developing countries (2.8% of live births) is seven times higher than in developed countries (0.4% of live births) (Meazaw et al., 2020). The increasing prevalence of preeclampsia should be considered as a serious warning that threat maternal, fetal and infant's health in the near future and should be focused by special attention particularly by policy makers and health planners who plan preventive and controlling programs (Kharaghani et al., 2016).

The pooled prevalence of preeclampsia between the years 2000 and 2018 in Sub-Saharan Africa was 4.1% (Gemechu et al., 2020) and Ethiopia was 4.74% (Tesfa et al., 2020) . Moreover, preeclampsia is associated with an increased risk of adverse fetal, neonatal, and maternal outcomes including premature delivery, fetal growth restriction, intra-uterine death, renal or hepatic failure, hemorrhage, and stroke (Mol et al., 2016, Duley, 2009, Wheeler et al., 2022).

Different studies showed that maternal age, previous history of (pre)eclampsia, diabetes mellitus, family history of preeclampsia, history of chronic hypertension and alcohol consumption, lack of ANC follow-up and primiparous are some of the identified factors associated with preeclampsia investigated by different studies (Endeshaw et al., 2016, Grum et al., 2017, Meazaw et al., 2020, Ayele and Tilahun, 2022, Godana et al., 2021).

Although though the majority of preeclampsia-related deaths can be preventable, the disease still has a high impact (Mrema et al., 2018). In Ethiopia, the Federal Ministry of Health (FMOH) has applied multi-pronged approaches to reducing maternal morbidity and mortality. These approaches have included improving access to and strengthening facility-based maternal health services(Tesfaye et al., 2018). Despite efforts to improve the use of maternity health services of magnitude and associated factor of preeclampsia, still remains (shallow?) high in Ethiopia. As far as literature searching showed, there is paucity of published evidence current magnitude and associated factors among women admitted delivery services particularly in the study areas. Therefore, the aim of this study to assess the magnitude and associated factor of Preeclampsia in Hiwot Fana Comprehensive Specialized University Hospital.

### **1.3 Significances of the study**

The finding of this study is primarily beneficial to be used for pregnant women to early detection and management complication and also by raise up the awareness about preeclampsia may enables early initiation of ANC follow up, give birth at institution and helps mother to receive postnatal care, it may add some value to reduce maternal and neonatal morbidity and mortality come related to preeclampsia. It helps health clinicians to understand the magnitude of the problem and factors influencing, and to create awareness in the community by giving health education based on the finding.

Additionally, the findings of this study can be of a paramount importance for Hiwot Fana Comprehensive Specialized University Hospital to plan for appropriate interventions and give more attention to the identified possible preventable factors that leads to preeclampsia. Finally finding also serves the researcher as a reference to conduct further study or longitudinal types of study.

### **1.4 Objective of the study**

#### **1.4.1 General objective:**

To assess magnitude of and factors associated with preeclampsia among pregnant women admitted in Hiwot Fana Comprehensive Specialized University Hospital, Harar Eastern Ethiopia from June 15 to July 14, 2022.

#### **1.4.2. Specific objective**

To determine the magnitude of preeclampsia among pregnant women admitted in Hiwot Fana Comprehensive Specialized University Hospital.

To identify factors associated with preeclampsia among pregnant women admitted in Hiwot Fana Comprehensive Specialized University Hospital.



## 2. LITERATURE REVIEW

### 2.1. Magnitude of preeclampsia

According to institutional cross-sectional study conducted in Iran, shows that overall prevalence of preeclampsia was 0.05% and (Kharaghani et al., 2016). Another facility based cross sectional study conducted in Bangladesh revealed that prevalence of preeclampsia was 14.4%(Mou et al., 2021). Another cross-sectional study conducted in India shows prevalence of preeclampsia was 28.7% (Agrawal and Walia, 2014). Study conducted in Tanzania revealed that prevalence of preeclampsia was 3.3%(Mrema et al., 2018).

According to institution-based cross-sectional study conducted in Ethiopia Arba Minch town show that the prevalence of preeclampsia was 18.25% (Shegaze et al., 2016) . Another hospital-based cross-sectional study conducted in Dessie referral hospital revealed that prevalence of preeclampsia among pregnant women was found to be 8.4%(Tessema et al., 2015). another study done in Southwest Ethiopia show that the prevalence of preeclampsia was 6.4 % (Gudeta and Regassa, 2019).

According to descriptive retrospective cross-sectional study done Gandhi memorial Hospital, Ethiopia shows that the prevalence of eclampsia was found to be 6.2% (Wassie and Anmut, 2021). A retrospective medical record review study done in Woldia General Hospital Medical archive, Ethiopia revealed that the likelihood of its occurrence among pre- eclamptic women was 7.1% (95% CI 2.7% to 11.5%)(Tlaye et al., 2021).

According to Institutional-based cross-sectional study conducted in Debre Tabor Comprehensive Specialized Hospital Northwest Ethiopia among 261 women shows that 15.7% of women had preeclampsia(Ayele and Tilahun, 2022). Additionally, hospital based cross-sectional retrospective study conducted in Dilla hospital show that the prevalence rate of preeclampsia in Dilla University Referral Hospital was found to be 2.23 % (Vata et al., 2015). Another study retrospective cross-sectional study hospital-based study conducted in Addis Ababa selected government hospital the five-year average proportion of preeclampsia was 4.2% (Wagnew et al., 2016).

## **2.2. Factor associated preeclampsia**

### **2.2.1 Socio-Demographic factor**

Sociodemographic factors in different literatures were assessed to determine their association with preeclampsia from those factors; age, marital status, residence, some of the factors that significantly associated with preeclampsia.

According to hospital-based cross-sectional study conducted in Dessie Ethiopia revealed that those pregnant women who were age 35 or above had 4.5 times [AOR = 4.5 (95% CI 1.56–12.8)] more risk of develop preeclampsia than those 25–29 years old, and currently unmarried pregnant women had about 3 times higher risk of developing preeclampsia than those married counter parts [AOR 3.03. 95% CI 1.12–8.2])(Tessema et al., 2015).

Unmatched Case– Control study conducted in Chiro Referral Hospital , Oromia Regional State, Ethiopia Being in the age group  $\geq 35$  years the risk of developing preeclampsia were 4-times higher among mothers compared to mothers in the age group 20–34 years (AOR=4.01; 95% CI=1.25–12.80), and rural residence was 3.3 times [(AOR=3.30; 95% CI=1.50–7.26)] higher among mothers living in urban residents compared to those residing in urban areas ((Katore et al., 2021).

And also, another Prospective Cohort Study conducted in Debre Markos Referral Hospital, North West Ethiopia shows that being  $\geq 35$  years old was 2.5 times risk and it was statistically significant predictors of pre-eclampsia (Birhanu et al., 2020).

According to Case– Control study conducted in Gedio Ethiopia shown that Mothers who can read and write were 87% less likely to [AOR=0.13, 95% CI (0.02, 0.76)] have preeclampsia and mothers who attended primary education were 93.1% less likely to [AOR=0.071, 95% CI (0.015, 0.32)] develop preeclampsia as compared to those who cannot read and write. Being housewives and Merchant were 13 times and 14 times more likely to have preeclampsia compared to those who were government employed (Mareg et al., 2020b). In contrast retrospective case-control study conducted in Nigeria revealed that mother occupation as a housewife 1.9 more likely (OR = 1.9; P = 0.008) to have preeclampsia (Guerrier et al., 2013).

### **2.2.2 Obstetric, gynecological and Reproductive Health Related Factors**

According to a case-control study conducted in Sierra Leone: shows that family predisposition for Preeclampsia and eclampsia in a full sister or mother raised a woman's risk about two to threefold, whereby an affected half-sister had no significant influence on the risk of a woman (AOR = 2.72, 95% CI: 1.46–5.07) (Stitterich et al., 2021).

According to study conducted in N. Sudan shows that being primiparity 3.3 times (OR=3.3, 95% CI: 2.7– 4.0), and multi-para 3 times (OR=3.1, 95% CI: 2.4– 4.0) more likely risk of developing preeclampsia, (Adam et al., 2013). Another study done in Sudan revealed that Lack of antenatal care visits during pregnancy increased 14 times the risk of having preeclampsia/eclampsia as compared to women had ANC visits (OR = 14.174, 95% CI=5.284 –38.024, P < 0.001) (Ahmed et al., 2020) .

According to institutional based Cohort Study conducted in Ethiopia revealed that lack of ANC follow-up during pregnancy increased 1.7 times the risk of having preeclampsia/eclampsia as compared to women had ANC visits (AHR: 1.75; 95% CI: 1.22–2.51; P=0.002) (Godana et al., 2021).

According to prospective hospital-based cross-sectional study conducted in Cameroon Douala revealed that being primiparous women have 4.18 times risky of developing preeclampsia as compared to women with multi gravida (OR: 4.18; 95% CI: 1.82, 9.61), parity >4 (OR: 2.99, 95% CI: 0.94, 9.55) (Nguefack et al., 2018).

According to case control study conducted in Addis Ababa, Ethiopia: shows being primigravida were 2.68 times higher in women with primigravida comparing to the women with multigravida (AOR: 2.68 95% CI: 1.38, 5.22), women who had previous history of preeclampsia were 4.28 times higher for the women with history of preeclampsia comparing to their counterparts (AOR: 4.28, 95% CI: 1.61, 11.43), Women who had multiple pregnancies (twin) had 8.22 higher risk of pre-eclampsia comparing to women with singleton pregnancy (AOR: 8.22 95% CI: 2.97, 22.78), has increased risk association of preeclampsia, (AOR: 2.68 95% CI: 1.38, 5.22) (Grum et al., 2017).

According to Unmatched Case– Control study conducted in Chiro Referral Hospital, Oromia Regional State, Ethiopia: being primigravida: Prim gravid mothers had above 3-times higher risk of developing preeclampsia than multi gravid mothers (AOR=3.71, 95% CI=1.49–9.22) (Katore et al., 2021).

According to facility based unmatched case-control study design conducted in two public hospitals of North Wollo Zone, Ethiopia shows that previous history of preeclampsia: women having previous history of preeclampsia were shown to develop preeclampsia could be increased by four times as compared with preeclampsia in those women having no previous history of preeclampsia (AOR = 4.14 95%CI: (1.66-10.33) (Demissie et al., 2021).

Another Prospective Cohort Study conducted in Debre Markos Referral Hospital, North West Ethiopia shows that having a history of multiple pregnancy mothers who had a history of multiple pregnancy were at 3.4 times higher risk of experiencing pre-eclampsia than those pregnant women who had no history of multiple pregnancy [AHR=3.4 (95% CI=2.8–6.9)] (Birhanu et al., 2020).

Additionally, study done in the Omo district of Southern Ethiopia: revealed that woman with preterm gestational age <37 weeks 1.57 times (AOR:1.57, 95% CI: 1.05-2.33) more likely develop preeclampsia compared to woman with gestational age >37weeks,(Fikadu et al., 2021).

A cross-sectional study conducted in Mettu Karl referral hospital, Ethiopia revealed that women who had no current multiple pregnancies were less likely to be preeclamptic than those women with current multiple pregnancy (AOR = .071, 95% CI = [.007, .773]) , women having previous history of preeclampsia were shown to develop preeclampsia/eclampsia could be increased by four times as compared with preeclampsia/eclampsia in those women having no previous history of preeclampsia (AOR: 4.28, 95% CI: 1.61, 11.43), (Belay and Wudad, 2019).

### **2.2.3 Medical illness related factor**

According to a case-control study in Sierra Leone: preexisting hypertension women who suffered chronic hypertension were almost 3.64 times more likely to become preeclamptic or eclamptic than women without the condition (AOR = 3.64, 95% CI: 1.32–10.06) (Stitterich et al., 2021).

According to Institutional-based cross-sectional study conducted in Debre Tabor Comprehensive Specialized Hospital Northwest Ethiopia shows that, history of chronic hypertension 2.9 times more likely to develop preeclampsia (AOR:2.93; 95% CI: 1.00-6.20)(Ayele and Tilahun, 2022). A prospective multi-centre unmatched case-control study

conducted among pregnant women attending antepartum or intrapartum care in public health facilities of Bahir Dar city anemia during pregnancy increased the risk of having preeclampsia/eclampsia more than 2.47 times (AOR: 2.47 (1.12 - 7.61) as compared to mothers without anemia (Endeshaw et al., 2015).

According facility based unmatched case-control study design conducted in two public hospitals of North Wollo Zone, Ethiopia shows that ,family history of DM women with a family history of DM were 2.15 times more likely to develop preeclampsia or eclampsia during pregnancy [AOR = 2.15, 95%CI: (1.12-6.98)], has major risk factor for preeclampsia (Demissie et al., 2021).

According to Unmatched Case– Control study conducted in Chiro Referral Hospital, Oromia Regional State, Ethiopia having a family history of chronic hypertension mothers with chronic hypertension increased 3.25 times the risk of having preeclampsia/eclampsia as compares to women without chronic hypertension (AOR=3.25; 95% CI=1.36–7.73), and were identified as risk factors for preeclampsia (Katore et al., 2021)

According to hospital-based cross-sectional study conducted in Dessie Ethiopia reveled that Those women with family history of hypertension had about 7.2 times higher risk of developing preeclampsia than women who haven't [AOR 7.19, 95% CI 3.4–15.2 and chronic hypertension history of chronic hypertension had about 4.3 times higher risk of developing preeclampsia than women who haven't [AOR = 4.3 (95% CI 1.33–13.9)], also women with family history of diabetes mellitus had 2.4 times higher odds of developing preeclampsia as compared to those with no family history of DM. [AOR 2.4, 95% CI 1.09 – 5.6)] (Tessema et al., 2015).

According to cross-sectional study conducted in Arba Minch town Family history of hypertension A women who had family history of hypertension were 3.52 times more likely to develop preeclampsia as compare to those who didn't have family history of hypertension (AOR=3.52; 95% CI: (1.31-9.45 ) (Shegaze et al., 2016).

And also another Prospective Cohort Study conducted in Debre Markos Referral Hospital, North West Ethiopia shows that Having a pre-existing history of diabetes mellitus :women with preexisting history of diabetes mellitus had 2.7 times higher risk of developing preeclampsia as compared to those with no family history of DM [AHR=2.7

(95% CI=1.43–8.81)],] (Birhanu et al., 2020) were the significant predictors of preeclampsia.

According to facility based unmatched case-control study design conducted in two public hospitals of North Wollo Zone, Ethiopia shows that family history of HPN 5.9 times more likely to develop/ risk for Preeclampsia (AOR = 5.93, 95%CI: (2.39-14.67) (Demissie et al., 2021).

#### **2.2.4 Behavioral related factors**

According to Institutional-based cross-sectional study conducted in Debre Tabor Comprehensive Specialized Hospital Northwest Ethiopia shows that alcohol consumption during pregnancy 2.12 times higher odds of developing preeclampsia (AOR: 2.12; 95 % CI: 4.00-14.14) as compared to their counterparts(Ayele and Tilahun, 2022). Additionally, study done in the Omo district of Southern Ethiopia: revealed that woman with pre-conception smoking exposure (active smoker) were 4.2 times (AOR: 4.25, 95% CI: (1.15-15.7) more likely develop preeclampsia compared to woman with nonsmoker,(Fikadu et al., 2021). And

According to case control study conducted in Addis Ababa, Ethiopia: shows drinking alcohol during pregnancy were 3.97 times more likely develop preeclampsia compared to woman with non-drinking alcohol (AOR: 3.97, 95% CI: 1.8, 8.75) (Grum et al., 2017). another study conducted in Arba Minch town shows that Alcohol use during pregnancy were 8.06 times increasing risk to preeclampsia when compared to women with non-alcohol use (AOR=8.06; 95% CI: (2.3-28.5) (Shegaze et al., 2016).

Study conducted in Yemen revealed that Khat chewer pregnant women were risks when compared with the control such as a risk of 4.10 times for preeclampsia (Abdel-Aleem, 2015).

### 2.3 Conceptual frame work

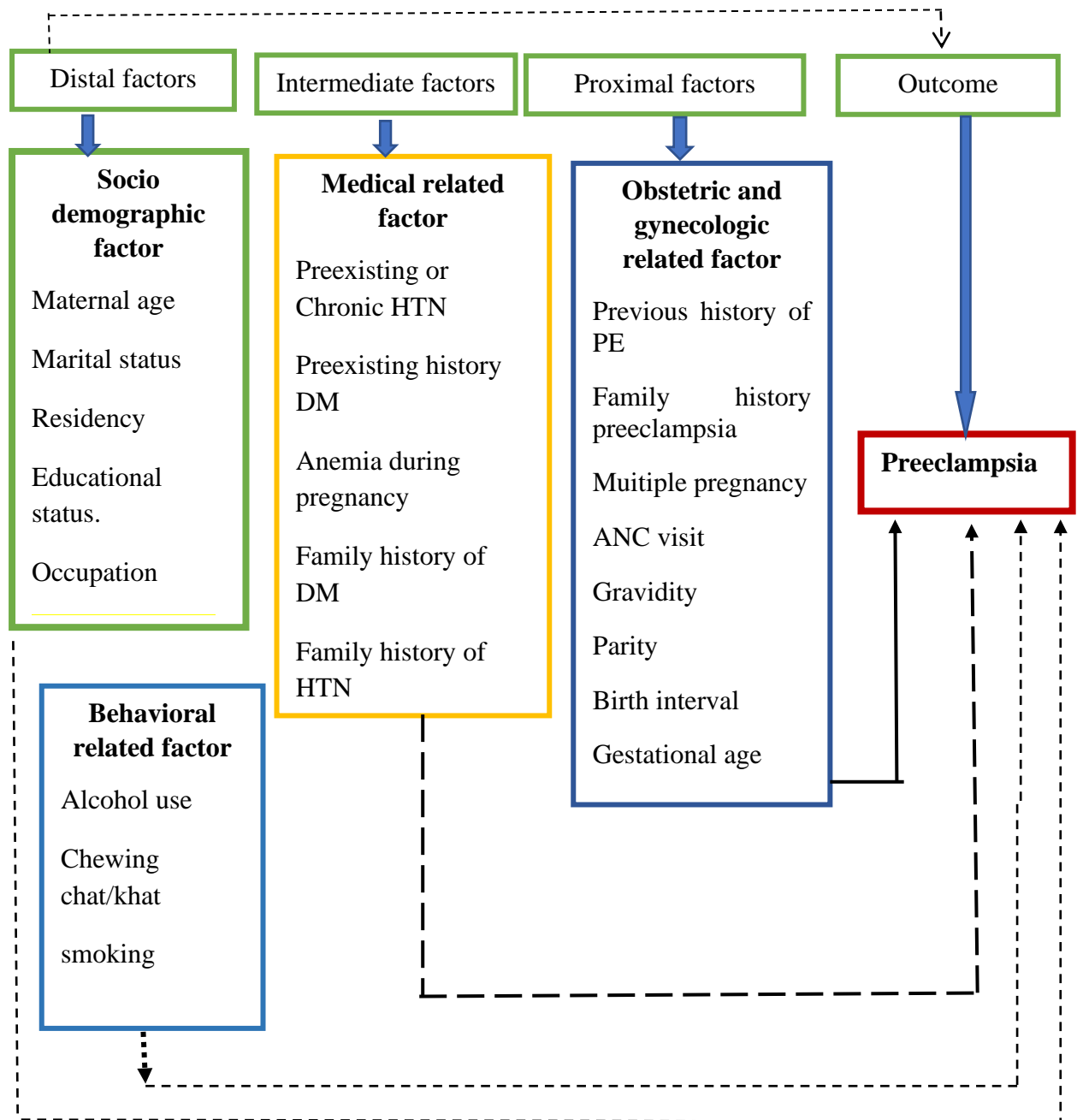


Figure 1: Conceptual framework to identify factor associated with preeclampsia among pregnant women who are admitted to Hiwot Fana Comprehensive Specialized University Hospital, Harar, Eastern Ethiopia 2022.

Developed by investigator via reviewing different literatures. (Katore et al., 2021, Tessema et al., 2015) (Tesfa et al., 2020) (Birhanu et al., 2020) (Shegaze et al., 2016) (Grum et al., 2017) (Meazaw et al., 2020) ,(Fikadu et al., 2021).

## **3. METHOD AND MATERIALS**

### **3.1 Study area and period**

The study was conducted in Hiwot Fana Comprehensive Specialized University Hospital (HFCSUH) which is located in Harari region in the eastern part of the country at a distance of 525 km away from Addis Ababa, the capital city of Ethiopia. HFCSUH, a tertiary referral hospital affiliated with Haramaya University, College of Health and Medical Sciences. HFCSUH serves as the referral center for about five million populations in eastern Ethiopia. The hospital provides service to more than 154,196 patients yearly with various general and specialized clinics (Mohammed et al., 2022). It has four major departments (medical, surgery, pediatrics and gynecology-obstetrics with 33, 42, 50 and 60 beds, respectively) and 6 minor departments (psychiatry, dental clinic, radiology unit, dermatology, ophthalmology, and chronic follow-up clinic visit). The gynecology and obstetrics ward have two separate wings: obstetrics and gynecology. During the study period, the obstetric ward has 24 midwives, 17 obstetricians, 30 residents; according to 2022 HMIS report annual deliveries was 4715. The study was conducted from June 15 to July 14, 2022.

### **3.2 Study design**

An institution based cross-sectional study was employed.

### **3.3 Source and study population**

#### **3.3.1 Source population**

All pregnant women admitted in Hiwot Fana Comprehensive Specialized University Hospital.

#### **3.3.2 Study population**

Randomly selected pregnant women admitted Hiwot Fana comprehensive Specialized University Hospital from January 1, 2019 to December 31, 2020.

### **3.4. Inclusion and Exclusion Criteria**

#### **3.4.1. Inclusion Criteria**

Pregnant woman with gestational age of 20 weeks and above (calculated from last normal menstrual period or early ultrasound) during the study period



### 3.4.2 Exclusion Criteria

Cards with missing pertinent variables were excluded, (records which not clearly state the patient's diagnosis, blood pressure measurement and Gestational age < 20).

## 3.5. Sample size determination and procedure

### 3.5.1. Sample size determination

The sample size was determined for both objectives and the largest sample size was considered. For first objective, single population proportion formula with the following assumptions was used: prevalence of preeclampsia (18.25%) from a study in Arba Minch (Shegaze et al., 2016), 95% confidence level, 4% marginal error (d), and 10% non-response rate (n=394).

Where:

$Z_{\alpha/2}$ =Critical value for normal distribution at 95 % confidence interval, which is equals to 1.96 (Value at  $\alpha=0.05$ ).

$P=18.25\%$ , expected proportion of preeclampsia.

$d=0.04$ , is the margin of error

$$n = \frac{(z_{\alpha/2})^2 p(1 - p)}{d^2}$$

$$n=1.96^2 *0.1825 (1-0.1825)/0.04^2$$

$n= 358$  by adding 10% non- response rate (394).

For the second objective, different factors associated with the pre-eclampsia were considered with a power of 80%, 95% CI, a ratio of 1:1, 10% non-response rate: (Table 1).

Table 1: sample size determination for factors associated with preeclampsia among pregnant women who are admitted to Hiwot Fana comprehensive specialized university hospital, Harar, Eastern Ethiopia 2022.

Factors $\alpha= 95\%$ Power ( $\beta$ ) or % chance of detecting) = 80 Assumption Ratio 1:1			Total sample	By adding 10% of non-response rate	Reference
Alcohol consumption AOR: 2.26	% outcome in unexposed group:8.4%	% outcome in exposed group:19 %	366	403	(Ayele and Tilahun, 2022)
History of chronic hypertension AOR: 2.30	% outcome in unexposed group:13%	% outcome in exposed group:30%	204	221	(Ayele and Tilahun, 2022)
currently unmarried pregnant women: AOR: 3.03	% outcome in unexposed group:7.7%	% outcome in exposed group:21.4%	234	258	(Tessema et al., 2015)

Hence the largest sample (n=403) from objective two was considered.

### 3.6. Sampling procedures

According to HMIS report from Hiwot Fana Specialized University Hospital, a total of 10,811 pregnant women were admitted to obstetrics and 361 pregnant women were admitted to gynecology ward from January 1, 2019 to December 31, 2020. The total sample size (403) was proportionally allocated to each selected ward, after getting details of pregnant women. Simple random sampling was used to select study participants from admission-discharge register of labor and delivery logbooks. All unique medical registration numbers of pregnant women were used to prepare sampling frame. Finally, eligible women were randomly chosen by a computer assisted simple random sampling method (Figure 2).

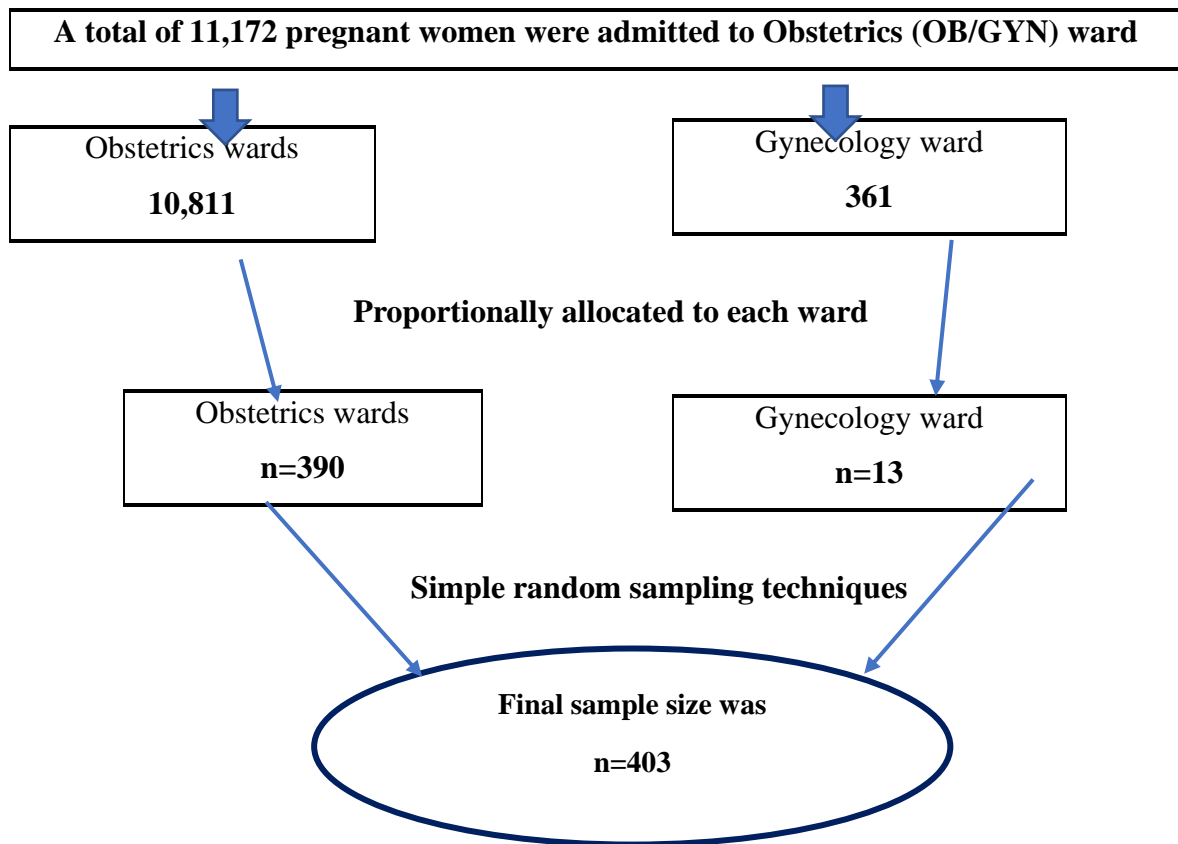


Figure 2: Schematic presentation for selecting pregnant women admitted in Hiwot Fana comprehensive specialized Hospital, Eastern Ethiopia, 2022.

### 3.7. Data collection methods

#### 3.7.1 Data collection instruments

Data were extracted using pretested and structured checklist, which is originally developed in English, and the tool was developed after reviewing relevant literatures (Ayele and Tilahun, 2022, Belay and Wudad, 2019, Fikadu et al., 2021). The checklist was designed to obtain information on socio demographic factors, past obstetric and gynecologic factors, current pregnancy related factors, medical illness related and behavioral factors for preeclampsia.

#### 3.7.2 Data collectors

The data was collected by six BSc midwives and supervised by two MSc Midwife having previous experience in data collection.

### **3.7.3 Data collection procedures**

The actual data extraction was taken place in Hiwot Fana Comprehensive Specialized University Hospital. Records was retrieved using medical record numbers found from the labor and delivery ward. Then patient's card was collected from the archive room of the Hospital. All maternal records found from logbooks and cards was reviewed to obtain any information pertinent to the mother. Further elaboration, patient medical record chart and CHAMPS (child health and mortality prevention surveillance) admission format which had completed data about the history and variable were reviewed to obtain pertinent data, like Socio-demographic, Past obstetric and gynecologic history, Current pregnancy related history, Behavioral/habits related history and newborn; ultrasound findings and reports, maternal conditions, fetal conditions and mode of delivery.

## **3.8. Study variable**

### **3.8.1. Dependent variable**

Pre-eclampsia

### **3.8.2. Independent variable**

**Sociodemographic:** maternal age, marital status, residence, income, educational status and occupation.

**Obstetric, gynecologic and reproductive:** Gestational age, gravidity, parity, ANC visits, previous history of preeclampsia, family history of preeclampsia, multiple pregnancy, birth interval.

**Medical illness related:** maternal and family chronic hypertension, anemia during pregnancy, maternal and family diabetes mellitus history.

**Behavioral related factor:** drinking alcohol, smoking cigarette, chewing chat (data were extracted from chart by using **Yes or No**).

## **3.9. Operational definition.**

**Anemia:** a condition where the hemoglobin level in the body of pregnant mother is less than 11g/dl which depicts decreased oxygen carrying capacity of the body (Lebso et al., 2017). For this study we collected the maternal Anemia diagnosed when Data observed the number of pregnant women with decreased hemoglobin levels to less than 11. g/dl considered as anemia, whereas hemoglobin levels to  $\geq 11$ g/dl not anemia(Ali et al., 2011, De Benoist et al., 2008).

**Preeclampsia without severe features:** new onset of hypertension with raised BP  $\geq$  140/90 mmHg plus 24-hour urine protein greater than or equal to 300mg/24 hour or urine dipstick  $>+1$  after 20 weeks of gestation in previously normotensive women (American College of Obstetricians and Gynecologists (ACOG), 2020, Belay Tolu et al., 2020).

**Preeclampsia with severe features:** new onset of hypertension with raised BP  $\geq$ 160/110 mmHg on 2 occasions at least 4 hours apart, after 20 weeks of gestation in previously normotensive women and/or specific signs or symptoms of significant end-organ dysfunction includes one or more sign and symptom (severe headaches, epigastric pain, blurring of vision (American College of Obstetricians and Gynecologists (ACOG), 2020, Belay Tolu et al., 2020).

**Pre-eclampsia:** for this study preeclampsia were considered either preeclampsia with or without severity features which was confirmed as per clinician's diagnosis, BP and Urine protein level were checked from chart:

### **3.10. Data quality management**

Prior to conducting actual data collection, Two-day training was given to the data collector and supervisors about methods of data extraction, ethical consideration of study, and clarity of section of questionnaires. The questionnaire and data abstraction checklist were pretested on 5% (20) of the sample size in Jugal Hospital to ensure the internal validity and verify the appropriateness of the tools. Intensive supervision was carried out during the whole period of data collection on a daily basis. Collected data were checked for accuracy, consistency and completeness daily.

### **3.11. Data processing and analysis**

The data were, coded, and entered into computer using Epi-data 3.1 and exported to SPSS version 26 for analysis. Descriptive data analysis was computed to describe the characteristics of study participants by the outcome. The dependent/outcome variable was Preeclampsia, coded as '1' for diagnosed Preeclampsia and coded as '0' for no Preeclampsia. Bivariable and multivariable logistic regression analyses were performed to identify the predictors. A variable with a p-value less than 0.25 in the bivariate analysis was recruited for multivariable logistic regression analysis. Multi collinearity were checked by using variance inflation factor ( $<10$ ) standard error of  $<2$  and tolerance test  $> 0.1$  were

then no existence of multicollinearity. Hosmer-Lemeshow's test was used to check model fitness (0.867). An adjusted odds ratio (AOR) along with a 95% confidence interval at a p-value less than 0.05 was used to declare factors that were significantly associated with the outcome variable.

### **3.12. Ethical considerations**

Ethical clearance was secured from Haramaya University Institutional Health Research Ethics Review Committee with ethical approval number (*Ref.No IHRERC/097/2022*). A formal letter for permission and support was presented from Haramaya University to the HFCSUHs. An informed, voluntary, written and signed consent will be obtained from each head of the health facility after clearly informing them about the purpose, risk and benefit of the study. Confidential information about the identity of individual patients (individual participant identification number, name and facility registry code) will not be collected.

### **3.14. Information dissemination**

First, the results will be submitted and presented at Haramaya University, College of health and medical sciences (CHMS) for the final defense as requirement for partial fulfillment of Msc in Maternity and Neonatology Nursing. After presentation, the hard copies of the finding will be submitted to Haramaya University, CHMS, school of graduate study and school of graduate study library. The copies of the document will also be given to the HFCSUH administration to inform the findings of the study for possible recommendations. The findings will be presented in conferences and attempt will be made to publish it in peer reviewed reputable journals.

## **4. RESULTS**

### **4.1 Socio-demographic Characteristics**

A total of 400 charts were reviewed (99.25%). Concerning the age, 186 (47.30%) were between 20-34 years of age with the mean age of 24.95( $\pm$ 5.26) years. More than half of the

women were rural residents (225; 56.25%) and housewives (221;55.25%). Majority of women were married 395 (98.75%) while only a third (143;35.75%) of them attended primary education (**Table 2**)

Table 2: Socio-demographic characteristics of Pregnant women who admitted to Hiwot Fana comprehensive specialized university hospital, Harar, 2022 (n=400).

Variable	Categories	Frequency (n)	Percent (%)
Age	15-24	155	38.70
	25-34	189	47.30
	≥35	56	14.00
Residence	Urban	175	43.75
	Rural	225	56.25
Marital status	Married	395	98.75
	Single	5	1.25
Educational status	Unable to read and write	125	31.25
	Able to read or write	33	8.25
	Primary education (1-8)	143	35.75
	Secondary education (9-12)	52	13.00
	Diploma and above	47	11.75
Occupation	Housewife	221	55.25
	Farmer	56	14.00
	Merchant	55	13.75
	Daily labourer	15	3.75
	Government Employee	42	10.50
	*Other	11	2.75

\*other = Student, NGOs

## 4.2 Obstetric and gynecologic history of participants

More than six in ten (62.25%) of the women were multigravida and majority of them 324(81.0%) were admitted at term. Regarding birth spacing or duration between present and previous pregnancy 148(59.44%) were two and above year between birth interval. About 343(85.75%) mothers had antenatal care follow-up while 61(17.78%) had four or above visits (**Table 3**).

Table 3: Obstetric and gynecologic history of pregnant women who admitted to at Hiwot Fana comprehensive specialized university hospital, Harar, 2022 (n=400).

Variable	Categories	Frequency (n)	Percent (%)
Gravidity	Primigravida	151	37.75
	Multigravida	249	62.25
Gestational age at admission (in weeks)	Preterm (<37)	76	19.00
	Term (>=37)	324	81.00
Did mother refer	Yes	288	72.00
	No	112	28.00
Source of referral	Health centre	231	80.21
	Hospital	39	13.54
	Private hospital/ clinic	18	6.25
Birth spacing/interval (n=249)	<2year	101	40.56
	≥2year	148	59.44
Number of foetus	Twin	60	15.00
	single	340	85.00
Had ANC follow up	Yes	343	85.75
	No	57	14.25
Number of ANC visit (n=343)	One	34	9.91
	Two	150	43.73
	Three	98	28.57
	Four and above	61	17.78

### 4.3 Magnitude of preeclampsia

At admission, 69 (17.25%) of the pregnant women had preeclampsia and (10 eclampsia) at admission. All most all (78;98.73%) of the pregnant women were treated by magnesium sulphate. Moreover, about 96(24.00%) and 12(3.00%) of them had previous history of preeclampsia and family history of preeclampsia, respectively (Table 4).



Table 4: magnitude of preeclampsia among pregnant women who admitted at Hiwot Fana comprehensive specialized university hospital, Harar, 2022 (n=400).

<b>Variable</b>	<b>Categories</b>		<b>Frequency (n)</b>	<b>Percent (%)</b>
Preeclampsia	No		321	80.25
	Yes		69	17.25
Eclampsia at admission	No		390	97.50
	Yes		10	2.50
Proteinuria	+1		18	4.50
	+2 and above		77	19.25
	Not done		305	76.25
Sign and symptoms (n=72)	Severe headache	Yes	66	91.67
		No	6	8.33
	Blurring of vision	Yes	59	81.94
		No	13	18.06
	Epigastric pain	Yes	64	88.89
		No	8	11.11
	Abnormal body movement	Yes	10	13.89
		No	62	86.11
Treatments given (n=79)	Mgso4	Yes	78	98.73
		No	1	1.27
	Hydralazine	Yes	36	45.57
		No	43	54.43
	Nifedipine	Yes	51	64.56
		No	28	35.44
	Methyldopa	Yes	51	64.56
		No	28	35.44
Maternal History of preeclampsia	Yes		96	24.00
	No		304	76.00
Family history of preeclampsia	Yes		12	3.00
	No		388	97.00

#### 4.4 Medical illness and behavioral related history

Concerning about medical illness 14 (3.50%) of had history of Preexisting or chronic HTN. 67(16.75%) and 14(3.50%) of had Family history of chronic hypertension and Family history of diabetes mellitus respectively. Regarding the anemia during pregnancy; majority of them 130(32.50%) pregnant women were categorized as anemia based on Hgb level during pregnancy. Regarding behavioral/habit related factor from the total pregnant women; nearly one fourth of 92(23.00%) women had Chewing khat in current pregnancy.

Table 5: Medical illness and behavioral history pregnant women who admitted to at Hiwot Fana comprehensive specialized university hospital, Harar, 2022 (n=400).

Variable	Categories	Frequency (n)	Percent (%)
Preexisting or chronic HTN	Yes	14	3.50
	No	386	96.50
Family history of chronic hypertension	Yes	67	16.50
	No	333	83.50
Pre-existing DM	Yes	3	0.750
	No	373	99.25
Family history of DM	Yes	14	3.50
	No	386	96.50
Anemia based on Hgb level during pregnancy	Anemia (Hgb < 11g/dl)	130	32.50
	No anemia ( $\geq$ 11.00 g/dl)	270	67.50
Did she Smoke in current pregnancy	Yes	16	4.00
	No	384	96.00
Did she Chewing khat in current pregnancy	Yes	92	23.00
	No	308	77.00

#### 4.5 Maternal and fetal outcomes among preeclamptic mother

From a total of 69 preeclampsia diagnosis; majority of labor 42 (60.87%) were induced before onset of labor spontaneously. About 27 (39.13%) women were gave birth through spontaneous vaginal delivery and nearly three-fourth of 50(72.46%) mother were gave

alive birth. Regarding birth weight at birth one fourth or 25 (36.23%) of neonates were below the 2500gm. (Table 6)

Table 6: Maternal and fetal outcome among preeclampsia diagnosis pregnant women who admitted to at Hiwot Fana comprehensive specialized university hospital, Harar, 2022 (n=69).

Variable	Categories	Frequency (n)	Percent (%)
Onset of labor	Spontaneous	19	27.54
	Induced before labor start	42	60.87
	CS before labor	5	7.25
	No labor pain/ discharged	3	4.35
Mode of delivery	Vaginal delivery	27	39.13
	Instrumental delivery	22	31.88
	Cesarean section	16	23.19
	Assisted breech	2	2.90
	Not delivered	2	2.90
Neonatal outcome (n=67)	Live birth	50	74.62
	Still birth	17	25.37
Birth weight	< 2500gm	25	36.23
	≥ 2500gm	44	63.77

#### 4.6 Factors associated with preeclampsia

In the bivariate analysis, age, residence, educational status, number of fetus, ANC follow up, gestational age at admission, history of preeclampsia, family history of hypertension, anemia, chewing khat, were associated with preeclampsia at  $p < 0.25$ . However, in the multivariable logistic regression, age, family history of preeclampsia, family history of hypertension, anemia, chewing khat were remained significant at  $p < 0.05$ .

The odds of occurrences of preeclampsia among pregnant women who were 35 and older was 4.50 times (AOR=4.50; 95% CI 1.89-10.76) compared to those 25-34 years old. Similarly, mother who had history of preeclampsia were 2.42 times (AOR=2.42; 95% CI 1.16-5.04) more likely develop preeclampsia as compared to their counter parts. Furthermore, women with a family history of chronic hypertension were 4.54 times

(AOR=4.54;95% CI 2.23- 9.23) more likely to have preeclampsia as compared to their counter parts. Anemic were also 2.6 times (AOR=2.62; 95% CI 1.35-5.09) more likely to develop preeclampsia. We have also found that pregnant women who chew khat were nearly 3 times (AOR=2.98; 95% CI 1.50-5.91) more likely to have preeclampsia compared to those who didn't chew. (Table 7)

Table 7: Factors associated with preeclampsia among pregnant women who admitted to at Hiwot Fana comprehensive specialized university hospital, Harar, 2022 (n=400).

Variable	Preeclampsia		COR (95%CI)	AOR (95%CI)	P-value
	Yes (%)	No (%)			
<b>Age</b>					
15-24	21(13.55)	134(86.45)	1.49(0.76, 2.90)	1.78 (0.81,3.88)	0.147
25-34	18(9.53)	171(90.47)	1	1	
≥35	30(53.57)	26(46.43)	10.96(5.36, 22.41)	<b>4.50 (1.89, 10.76)</b>	<b>0.001</b>
<b>Residence</b>					
Urban	20(11.43)	155(88.57)	1	1	
Rural	49(21.78)	176(78.22)	2.15(1.22, 3.78)	0.89(0.41, 1.92)	0.768
<b>Maternal educational status</b>					
Unable to read and write	30(24.00)	95(76.00)	2.15(1.23, 3.75)	1.27 (0.57, 2.80)	0.557
Able to read and write	8(27.59)	21(72.41)	2.18(0.90, 5.26)	1.49(0.52, 4.23)	0.456
Primary and above	31(12.81)	211(87.19)	1	1	
<b>Number of foetus</b>					
Twin	19(31.67)	41(68.33)	2.68(1.44, 5.00)	1.14 (0.48, 2.59)	0.769
One	50(14.71)	290(85.29)	1	1	
<b>ANC follow up</b>					
Yes	52(15.16)	291(84.84)	1	1	
No	17(29.82)	40(70.18)	2.37(1.25, 4.50)	1.39 (0.61, 3.16)	0.430
<b>Gestational age</b>					
< 37 weeks	21(27.63)	55(72.37)	2.19(1.21, 3.96)	1.84 (0.90, 3.76)	0.094
≥37	48(14.81)	276(85.19)	1	1	

<b>History of preeclampsia</b>					
Yes	34(35.42)	62(64.58)	4.21 (2.44, 7.28)	<b>2.42 (1.16, 5.04)</b>	<b>0.018</b>
No	35(11.51)	269(88.49)	1	1	
<b>Family history of chronic hypertension</b>					
Yes	26(38.81)	41(61.19)	4.27(2.38, 7.69)	<b>4.54 (2.23, 9.23)</b>	<b>0.0001</b>
No	43(12.91)	290(87.09)	1	1	
<b>Anemia</b>					
Yes	41(31.54)	89(68.46)	3.98(2.32, 6.82)	<b>2.62 (1.35, 5.09)</b>	<b>0.004</b>
No	28(10.37)	242(89.63)	1	1	
<b>Chat chewing</b>					
Yes	37(40.22)	55(59.78)	5.80(3.33, 10.10)	<b>2.98 (1.50, 5.91)</b>	<b>0.002</b>
No	32(10.39)	276(89.61)	1	1	

1= reference; COR= crude odds ratio; AOR= adjusted odds ratio; CI= confidence interval

## 5. DISCUSSION

This study was conducted to assess the magnitude and factors associated with preeclampsia in Hiwot Fana Comprehensive Specialized University Hospital. We found that 17.25% (95% CI: 13.85-21.28) of the women included in this study have preeclampsia. Preeclampsia was more likely among women with age, history of preeclampsia, family history of chronic hypertension, anemia and khat chewing and one-fourth of 17(25.37%)

mother were gave still birth and weight at birth one fourth or 25 (36.23%) of neonates were below the 2500gm.

Our finding is in line with studies from Bangladesh 14.4%(Mou et al., 2021) and some parts of Ethiopia: Arba Minch 18.25% (Shegaze et al., 2016) and Debre Tabor 15.7% (Ayele and Tilahun, 2022). This is however, higher than findings studies in Iran 0.05% (Kharaghani et al., 2016), Tanzania 3.3%(Mrema et al., 2018), and some other parts in Ethiopia: Dessie Referral Hospital, 8.4%(Tessema et al., 2015), and Mezan Tepi 6.4% (Gudeta and Regassa, 2019). This discrepancy might be explained by differences in geographical, cultural and lifestyle behaviors, or healthcare-seeking behavior of women. Moreover, the fact that our study was conducted in a referral hospital, where mainly women with complications are treated, might partly explain this difference.

Consistent with previous studies in Sudan (Adam et al., 2013) and Debre Markos, Ethiopia (Birhanu et al., 2020), women with advanced age ( $\geq 35$  years) were more likely to develop preeclampsia. This might be related with hemodynamic adoption problem among old women. Aging is also found to be a mediator of vascular damage (Bilano et al., 2014) due to gradual loss of cardiovascular vessel compliance due to aging of uterine blood vessels and increased arterial stiffness causing endothelial dysfunction (Birhanu et al., 2020). Moreover, older women tend to have additional risk factor, such as diabetes mellitus and chronic hypertension, that predispose them to developing preeclampsia.

Women with history of preeclampsia were more likely to develop preeclampsia compared with their counterparts. This has been widely reported previously (Demissie et al., 2022, Konar, 2018, ACOG, 2020). Not only personal history but also family history of hypertension was also found to be associated with developing pre-eclampsia(Tessema et al., 2015, Shegaze et al., 2016, Mareg et al., 2020a). As such, women's personal and family history should be clearly evaluated during prenatal counseling and due to genetic factors, that contribute to the physiologic predisposition of preeclampsia.

We have also found that women with anemia were more likely to develop preeclampsia as compared to their counter parts. Consistent with previous studies in Ethiopia (Endeshaw et al., 2015). This might be related with micronutrient and antioxidant deficiencies, which are probable contributors to the development of pre-eclampsia(Bilano et al., 2014).

Chewing khat was also found to increase the likelihood of developing preeclampsia. The finding is consistent with a previous study from Yemen (Abdel-Aleem, 2015). Given few reports of increased risk of hypertension among Khat chewers, this might also increase risk of pre-eclampsia (Geta et al., 2019, Sallam et al., 2018, Alshoabi et al., 2022).

## **6. STRENGTHS AND LIMITATIONS OF THE STUDY**

### **6.1. Strengths**

This study has several strengths; first this study used the CHAMPS (Child Health and Mortality Prevention Surveillance) assessment or admission format sheet to review the chart along with medical record cards. Data collectors in this study were well experienced this allow consistent retrieval of information from document. Additionally, this study was

including some variable like khat chewing, which were not addressed in the previous studies in Ethiopia.

## **6.2. Limitations**

Given this study was conducted in a single referral center, our findings may not be generalizable to those visiting lower facilities. In addition, retrospective data are subjected to information bias. Finally, due to poor chart documentation of patient's information in the study area, it was difficult to increase the scope of study. Furthermore, the cross-sectional nature of the data, which makes it impossible to draw inferences about the cause-and-effect relationship between outcome and associated variables.

## **7. CONCLUSION AND RECOMMENDATIONS**

### **7.1. Conclusion**

Almost one in five women giving birth in Hiwot Fana Comprehensive Specialized University Hospital developed Preeclampsia. Maternal age  $\geq 35$ , having history of preeclampsia, family history of chronic hypertension, anemia and chewing khat were associated with pre-eclampsia.

### **7.2 Recommendations**

**Based on the above findings, the following recommendations are forwarded:**



**For HCSUH:**

- The hospital should organize health education programs that focus on creating awareness about the need of periconceptional care and full ANC follow up for early detection, treatment and counselling on some modifiable factor associated with preeclampsia like Anemia, chat

**For Researchers**

- Advanced studies to identifying additional variable by using other study designs and including other institution.

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## 9. ANNEXES

### 9.1. Information sheet and informed voluntary consent form for head of institution

**Introduction** My name is Asanti Jiregna. I am the principal Investigator of a study to be conducted in Harar selected public health facilities, Harar for my Master's degree at Haramaya University, the College of Health and Medical Sciences. I kindly request you to lend me your attention to explain you about the study and your institution being selected as the study setting.

**1. The study/project title:** Magnitude and factors associated with preeclampsia among pregnant women who are admitted to obstetric ward of Hiwot Fana Comprehensive Specialized University Hospital, Harar, Eastern Ethiopia, 2022.

**2. Purpose/aim of the study:** This study will provide up-to-date information about prevalence and factors associated with preeclampsia in Hiwot Fana Comprehensive Specialized University Hospital, Harar. which are important to know areas of interventions that help to improve maternal and neonatal health. It is also important for participating hospitals to allocate resources for maternal health services based on magnitude of the problem. In addition, this study will provide evidence for health care providers to provide care as well as to tackle the problem in scientific way. Moreover, the aim of this study is to write a thesis as a partial requirement for the fulfillment of a Master's Program in Maternity and Neonatal Nursing for the principal investigator.

**3. Procedure and duration:** Data will be collected from medical records of pregnant women who were admitted to labor and delivery in this hospital from 1st January 2019 to 31st December 2021 using a checklist that is helpful for the study. The data collection on each medical record of pregnant women will take about 25-30 minutes.

**4. Risks and benefits:** The risk of participating in this study is very minimal, but only taking medical records of pregnant women for extraction of data. There would not be any direct payment for participating in this study. But the findings from this research may reveal important information for the local health planners.

**5. Confidentiality:** The information that we will be provided will be kept confidential. There will be no information that will identify the participants in particular. The findings of the study will be general for the study community and will not reflect anything particular

of individual persons. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

**6. Rights:** This study will be done if you are voluntary on the behalf of the hospital. You have the right to allow (not) this study in your hospital. You have the right to stop the study if you observe any misconduct during data collection.

**7. Contact address:** If there are any questions or enquires any time about the study or the procedures, please contact: Contact address of the Principal Investigator:

Name: Asanti Jiregna

Phone number: +251920446485

Email address: [jiregnaasanti@gmail.com](mailto:jiregnaasanti@gmail.com)

Contact address of the responsible Institutional Health Research Ethics Review Committee (IHRERC) Haramaya University: ▪

Office phone: 0254662011 ▪

P.O.Box: 235, Harar, Ethiopia

**8. Declaration of informed voluntary consent:** I have read this information sheet. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participating and the contact address for any queries. I have been given the opportunity to ask questions for things that may have been unclear. I was informed that participants have the right to withdraw from the study at any time or not to answer any question that they do not want. I am also informed that the Hiwot Fana Comprehensive Specialized University Hospital, has the right to stop this study from being conducted if any misdeeds and unethical procedures are observed during the data collection process in the Hiwot Fana Comprehensive Specialized University Hospital premises. Therefore, I declare my voluntary consent on behalf of Hiwot Fana Comprehensive Specialized University Hospital, management to allow this study to be conducted in the Hospital with my initials (signature).

Name and Signature of Head of the Hiwot Fana Comprehensive Specialized University Hospital \_\_\_\_\_ Date \_\_\_\_\_

Name and Signature of the Principal Investigator: \_\_\_\_\_ Date \_\_\_\_\_

## 9.2. English Version Checklist

Name of Data collector \_\_\_\_\_ Date \_\_\_\_\_

Qualification \_\_\_\_\_ Data Collector agreement “I certify that I have filled the checklist in accordance with the training that is given to me and instructions stated in it. I have confirmed that the information “it’s correct.”

Signature \_\_\_\_\_ Date \_\_\_\_\_

Name of hospital \_\_\_\_\_

Maternal Medical Record number / (code) \_\_\_\_\_

Checked by supervisor for completeness: -

Supervisors Name \_\_\_\_\_ signature \_\_\_\_\_

**Code:** \_\_\_\_\_

**Reason for Admission / diagnosis /** \_\_\_\_\_

<b>Section I: - Socio-demographic Characteristics</b>			
No	Question	Response	Skip
101	Age of the mother	_____ years	
102	Place of residence	1. zone 2. woreda 3. Kebele	
103	Marital status	1.Married 2. Single 3.Divorced 4. Widowed 5.not married	
104	Maternal Educational background	1. Unable to read and write 2. Able to read or write 3. Primary education (1-8) _____ education (9-12) 4. 2 <sup>nd</sup> ry education (9-12) _____ education (9-12) 5. Diploma and above _____	
105	Maternal occupation	1. Housewife 2. Farmer 3. Merchant 4. Daily laborer 5. Government Employee 6. Non- government employee 7. Other (specify)	
106	What is family average monthly income?	1. _____ ETB 2. don't know	
<b>Section II: Obstetric, gynecologic and reproductive at admission</b>			
200	Does the mother refer?	1. yes 2. No	If the answer “No” for Q 200 skip to Q




			202
201	Source of referral	1. Health center 2. Hospital 3. _____ (Private hospital/ clinic)	
202	Gestational age at admission (in weeks)	_____	
203	Gravidity	_____ in number	If the answer “1” for Q 203 skip to Q 206.
204	Parity	_____ in number	
205	Current pregnancy interval (in months or years)	_____	
206	History of multiple pregnancy	1. Yes 2. No	If the answer “No” for Q 206 skip to Q 208
207	For how many times multiple pregnancy occurs?	_____ times	
208	Did she had ANC follow up for the current pregnancy?	1. Yes 2. No	If the answer “No” for Q 208 skip to Q 211
209	Where was the ANC?	1. local health center 2. private clinic\hospital 3. gov’t hospital	
210	Number of ANC visit	_____ times	
211	Did she use any modern hormonal contraceptive of before the current pregnancy?	1. Yes 2. No	If the answer “No” for Q 211 skip to Q 213
212	Type of hormonal contraceptive method used	1. Pills 2. Injectable 3. Implant 4. Others	
213	Blood pressure at admission	SBP/ DBP _____ mm Hg	
214	Highest blood pressure	_____ mm hg	
215	Protein urea	1.+1 2. +2 and above 3. not done	
216	Any sign and symptoms	1. Severe headache 2. Blurring of vision 3. Epigastric pain 4. Abnormal body movement	

		5.none of the above	
217	Diagnosis at admission	1. non preeclamptic 2. preeclampsia 3.severe preeclampsia 4.eclampsia	If the answer “1” for Q 217 skip to Q 222, if the answer “2 or 3” Q 217 skip to Q 220
218	Does she have convulsion	1.yes 2.no	
219	Frequency of convulsion	_____ in number	
220	Onset of preeclampsia	1. Antepartum 2. Postpartum	
221	Treatment given	1.mgso4 1. Yes 2. No 2. hydralazine 1.yes 2. No 3. nifedipine 1. yes 2. no 4. methyldopa 1.yes 2. no 5. others (specify)_____	
222	Did she have previous history of preeclampsia	1. yes 2. No	
223	Did she have family history of preeclampsia	1. yes 2. No	
<b>Section 3; Medical illness related</b>			
301	Preexisting or Chronic HTN	1. yes 2. No	
302	Preexisting DM	1. yes 2. No	
303	Maternal hemoglobin level at admission	_____ gm/dl	
304	family history of chronic hypertension,	1. yes 2. No	
305	Family history of diabetes mellitus	1. yes 2. No	
<b>Section 4: Behavioral related factor</b>			
401	Did she drink alcohol in current pregnancy	1. yes 2. No	
402	Did she Smoke in current pregnancy	1. yes 2. No	
403	Did she Chewing khat in current pregnancy	1. yes 2. No	
<b>Section 5: maternal and fetal outcome</b>			

500	Date of admission	_____d/m/year	
501	Date of discharge	_____d/m/year	
502	Length of stay	_____days.	
503	Is she Admitted to central intensive care unit (CICU)	1. yes    2. No	
504	Diagnosis at discharge	1. non-preeclampsia 2. preeclampsia 3. severe preeclampsia 4. Eclampsia   5. hellp syndrome	
505	On set of labor	1. spontaneous 2. induced before labor 3. elective c/s	
506	Mode of delivery	1. vaginal delivery 2. instrumental delivery 3. cesarean section 4. assisted breech 4. Not delivered	
507	Gestational age at delivery	_____ in wks	
508	Neonatal out come at birth	1. Live birth   2. Still birth	If the answer "2" for Q 508 skip to Q 510
509	Apgar score (at first and fifth minute)	_____	
510	Weight of baby at delivery	_____gm	
511	Still birth	1. fresh 2. macerated	
512	Maternal Blood Pressure at discharge	_____ mmhg	
513	Maternal condition at discharge	1. improved 2. referred to other institution 4. disappeared 5. maternal death	

## 9.3 Curriculum Vitae (CV)

### ➤ Personal identification

<b>Personal information</b> 	<b>Full name</b>	<b>Asanti Jiregna</b>
	Sex	Female
	Date of birth	April 13 /1993 G.C
	Place of birth	Nekemit, Oromia, Ethiopia
	Nationality	Ethiopian
	Phone	+251920446485
	Email	<a href="mailto:jiregnaasanti@gmail.com">jiregnaasanti@gmail.com</a>
<b>Address</b>	Current address	Harar, Ethiopia.

### 2. Educational background

- ❖ Primary school (1-8): - Nekemte catholic kidane mihret primary and secondary school
- ❖ Secondary school (9-10): - Nekemte catholic kidane mihret primary and secondary school
- ❖ Comprehensive (11-12): - Nekemte comprehensive and preparatory school
- ❖ Qualification: BSc Midwifery from ambo university with CGPA = 2.5

### 3. Work experience

- ❖ I have about 5 -year clinical experience at Hiwot fana specialized university hospital obstetric ward.

### 4. Language Skills

Language	Speaking	Reading	Writing
Afaan Oromo	Excellent	Excellent	Excellent
Amharic	Excellent	Excellent	Excellent
English	Excellent	Excellent	Excellent

### 6. Reference

Sr. Seble Mengistu -0910072855 (Head of obstetric ward at Hiwot fana specialized university Hospital)

Dr.Tadesse Gure -0913868714 (MD,Assistant professor of OBGYN at Hiwot fana specialized university Hospital)